

Chionaspis citri, Comstock.

Rio de Janeiro, on leaves and stems of orange (*Morcira*).
New to Brazil.

Pinnaspis pandani (Comstock).

Rio de Janeiro, on *Areca catechu*; a rather large red form (*Göldi*). Also on *Areca lutescens*.

New to Brazil. (This and the last have evidently been introduced with plants.)

Pseudacnidia trilobitiformis (Green).

Rio de Janeiro, on leaves of *Ficus scandens* in cultivation (*Göldi*).

An introduced species, native of the East Indies.

East Las Vegas, New Mexico, U.S.A.,
April 25, 1902.

LXXIV.—On Two new Earthworms of the Family Megascolicidæ. By FRANK E. BEDDARD, F.R.S.

THE present communication contains a description of two Acanthodriloid earthworms which I believe represent new species of their respective genera, viz. *Octochætus* and *Benhamia*.

(1) *Octochætus Beatrizæ*, sp. n.

I refer the single specimen of this worm in my possession to the genus *Octochætus** by reason of the two pairs of spermiducal glands in segments xvii and xix, the diffuse nephridia, the single gizzard, and the eight setæ in each segment. But it is clearly a new species, though not very widely removed in its structure from a species recently described from the same quarter of the world by Miss Fedarb†.

The worm, which is fully mature, measures 70 millim. in length, but is evidently rather contracted. The diameter is 4 millim. at most. The pigment of the skin, if any, has

* This genus was founded by myself (Proc. Zool. Soc. 1892, p. 668) for four species of earthworms (lately reduced by Dr. Michaelsen, in 'Das Thierreich,' Lief. 10, Oligochæta, 1900, p. 319, to three) from New Zealand. I cannot help agreeing with Michaelsen (Zool. Jahrbücher, xii. Abth. f. Syst. p. 242) that Miss Fedarb's *Benhamia Ailkeni* must go into the same genus.

† Journ. Bomb. Soc. xi. 1898, p. 432.

been dissolved by the alcohol. The prostomium is largely retracted within the mouth-cavity; a groove half divides the buccal segment.

The first four segments of the body are undivided by secondary annulations. Each of the two following segments is divided into two annuli. The seventh and eighth segments are quadriannulate, and the ninth and tenth are triannulate. There remain two segments before arriving at the clitellum; but these are at most indistinctly separated into two annuli.

The setæ are, as already mentioned, eight to each segment. They are all very ventral in position. The distance between setæ *c* and *d* is about twice and a half the distance between setæ *a* and *b*. I observed setæ to exist upon the clitellum.

The clitellum is fully developed all round the body. There is no trace of any ventral area devoid of clitellar tissue. The length of the clitellum is 5 millim. and that of the preceding section of the body 9 millim. It occupies segments xiii to xvii inclusive, as in some of the other species of the genus.

I am uncertain about dorsal pores, as the worm was much contracted by the alcohol in which it had been preserved. The oviducal aperture (on segment xiv) appears at first sight to be median and unpaired, as it has been stated to be in *Octochætus Aitkeni*. A careful examination, however, reveals two separate pores lying close together at the bottom of the groove-like depression, which might be taken for the actual pore. The area which bears the male pores is not very conspicuous, on account of the shortness of the postclitellar segment; and, moreover, the end of the clitellum, where it abruptly terminates at the xviiiith segment, rather hangs over and so conceals the anterior termination of the seminal grooves. The whole area lies entirely within the ventral setæ, the most ventrally placed of which couple lies a little to the outside of the seminal grooves. On either side of the seminal grooves the surface of the xviiiith and xixth segments was swollen and tumid, looking over the space occupied by the ventral setæ, and the boundary-line of the two segments in question was in consequence not quite so clear as elsewhere. This species therefore differs from the New-Zealand species of *Octochætus* in the much more medianly placed male pores and seminal grooves: in *Octochætus antarcticus*, for instance *, the spermiducal gland pores correspond in position to the outermost of the ventral couple of setæ. In *Octochætus Beatrix*, however, the seminal groove, though it lies entirely within the ventral setæ,

* Beddard, Proc. Zool. Soc. 1892, p. 669, fig. 1 A.

has the same bowed shape as in other *Octochaeti*. I think that all the setæ are present at least on segments xvii and xix. In any case, I distinctly identified the ventralmost seta of segment xix, and detached also a pair of setæ with the spermiducal gland of the same segment. I do not think that there are any penial setæ. Indeed, the existence of such would be hardly expected from the position of the various pores of the male system.

Of the internal anatomy I am not able to give a complete account; but I can call attention to a few facts which appear to aid in establishing the specific distinctness of this form. The gizzard is single and large and lies in the segment near to the spermatheca, but I am unable to fix the exact segment which it occupies. I consider this segment to be vii or viii. There is a single pair of unusually large calciferous glands in, I think, segment xv—the same segment in which they occur in *Octochaetus Aitkeni*. They are, however, rather different in shape in the two species. In the present species they are long and curved round the intestine, embracing it closely; they suggest a ram's horn in shape, and are divided by constrictions into a series of lobes, which heightens the resemblance.

The intestine is provided with a strong typhlosole, which ceases some little way before the end of the body. The typhlosole consists of a double fold projecting into the interior of the intestine. The dorsal blood-vessel is single and the last pair of hearts are in segment xiii.

The nephridia are, as I have already mentioned, diffuse. The most striking feature about the organs of reproduction is the small size of the various parts of this system. The conditions which characterize the present species are also found, though not to so marked a degree, in the closely allied *Benhamia Aitkeni*. I do not think that this is due to immaturity, since the clitellum is so fully developed. I should rather compare *Octochaetus Beatrice* in this particular with the two species of *Pheretima*, *P. taprobanae* and *P. virgo*. Of the former of these two species a very large number of examples have been examined both by myself* and by Dr. Michaelsen †, and the reproductive organs seem to be always small. In *P. virgo* ‡ the same condition is met with, though the number of specimens dissected was much less, and there is therefore room for doubt as to the mature or immature condition of the few specimens examined.

* Proc. Zool. Soc. 1892, p. 163.

† MT. Mus. Hamb. xiv. p. 243.

‡ Proc. Zool. Soc. 1900, p. 895.

The sperm-sacs I could not detect at all, so they must be very small. The spermiducal glands are short, not so long as the diameter of the body, and lie in one or two curves. The muscular duct is very slender. I have already referred to the absence of penial setæ.

The spermathecae are particularly small and inconspicuous. They lie in the usual segments, *i. e.* viii and ix, and each consists of a small oval pouch without diverticula. I particularly emphasize the absence of diverticula, since this is one of the chief differences from the closely allied *O. Aitkeni*.

Hab. Calcutta*.

(2) *Benhamia tanganyikæ*, sp. n.

I have described elsewhere † two species of this genus which Mr. J. E. S. Moore collected during his Tanganyika Expedition. He has recently been so good as to place in my hands another *Benhamia* which appears to be new. The differences which exist among the species of this now extensive genus are apt to be not large; it is desirable, therefore, to be as minute as possible in detailing the anatomical characters. The present species, for example, if only such generalities as are made use of by Dr. Michaelsen in his useful key for the discrimination of species ‡ are employed, would probably be referred to his species *Benhamia sylvestris*. I shall, however, bring forward reasons which lead me not to associate the specimen collected by Mr. Moore with *Benhamia sylvestris*, but to create a new species for it.

The worm is 16 millim. long and 6 millim. in diameter. It consists of about 112 segments.

The colour is yellowish with a touch of green; the clitellum a dirty white.

The prostomium is epicheilous; it is prolonged about half-way over the buccal segment.

The dorsal pores commence in front of the clitellum, but I am not able to fix the segment where they commence with accuracy. The setæ are strictly paired.

The clitellum is more extensive than in *B. sylvestris*; it extends over segments viii-xxi and is not saddle-shaped, but is developed all round the body.

The two oviducal pores are upon segment xiv and lie to the inside of the ventral couple of setæ. The spermathecal pores, on the other hand, correspond in position to the ventral pair of setæ; they lie intersegmentally—vii/viii and viii/ix.

* I owe the specimen to the kindness of Mr. F. Finn, F.Z.S.

† Proc. Zool. Soc. 1901, ii. p. 190.

‡ Oligochæta in 'Das Thierreich,' 1900, p. 335.

The male pores lie at the bottom of a deep sucker-like depression, which includes one segment in front of and one behind those pores. Its contour is that of an elongated oval, the sides being straight and parallel in the middle. A continuous furrow lying at the bottom of the depression separates the genital area from the vertical wall which bounds it. The colour of the genital area is precisely the same as that of the clitellum.

The seminal grooves connecting the pores of the xviii and xixth segments on each side are quite straight. In the middle of this area is another perfectly straight furrow dividing it into right and left halves.

The internal structure of this *Benhamia* shows no noteworthy divergences from the typical structure of the genus, though there are naturally details which allow of its being distinguished from its allies.

The nephridia do not form only "einen zottigen Besatz an der Innenseite der Leibeswand," as Michaelsen writes of the nearly allied *Benhamia sylvestris**. They are arranged, at any rate, behind the spermiducal glands, in seven or eight definite rows on either side of the nerve-cord, as in such a form as *Benhamia bolavi* (= *B. octonephra*). This disposition of the nephridia is very characteristic of certain species, and is probably therefore a valid mark of distinction between the *Benhamia* which I describe here as *B. tanganyikæ* and *B. sylvestris*.

None of the septa are especially thickened. Those separating segments xi to xv are rather more emphasized than the following.

The two large gizzards appear to lie in segments viii and ix.

The calciferous glands are unquestionably in segments xv, xvi, and xvii. The first two pairs are kidney-shaped and flattened from side to side; the last pair, those of segment xvii, are plumper in form but not quite so large. The glands of the fifteenth segment are larger than those of the sixteenth. The intestine has a typhlosole. The last pair of hearts are in segment xii and the dorsal vessel is single.

The organs of reproduction of this species are very noticeable, on account of the large size of the spermatheca and the spermiducal glands.

The sperm-sacs, on the other hand, are not quite so conspicuous. I can recognize, in fact, only one well-developed pair, which lie in segment ix and are attached to the posterior of the septa bounding that segment. They are rounded and

* 'Die Regenwürmer Ost-Afrikas,' 1896, p. 28.

project forwards. In segment xii are another pair of unlobbed sperm-sacs, which are small, smooth, and rounded, and attached to the anterior wall of that segment. I found developing sperm in these, which settles their nature, otherwise, perhaps, on account of their small size, doubtful.

The anterior pair of supposed sperm-sacs seem, however, rather to be put down as seminal sacs projecting or bulging into segment ix, for a destruction of the wall of the sac reveals the anterior pair of funnels lying inside. Corresponding, however, to the small rounded sperm-sacs of segment xii are a perfectly similar pair in segment xi; so that this species appears to be different to *B. sylvestris*, where Michaelsen locates the sperm-sacs in segments x and xi. He mentions, however, a projection of the sperm-sac into segment xii, an appearance which may possibly be correlated with greater maturity and a consequent fusion of sacs originally distinct.

The ovaries are fairly conspicuous and lie, of course, in segment xiii.

The spermiducal glands of this species are very large and much coiled. They are so bulky as to extend into a segment on each side of that which bears their external orifice. I do not think it possible to say that the anterior pair show any difference in size from the posterior pair. The muscular duct is rather long and folded upon itself. It is of less diameter to begin with, widens in the middle tract, and again narrows before its opening on to the exterior. Between the gland and the duct there is no sharp demarcation. The duct itself has the usual nacreous appearance, due, of course, to the muscular folds of its walls. But before this nacreous appearance is visible is a narrow tube of the same appearance as the glandular part, but marked off from it by its narrower calibre, which is suddenly acquired. This region, as it appears to me, is the equivalent of the duct of the spermiducal gland in some other Acanthodriloid types where the duct is not distinguished by its nacreous glitter—for example, in *Octochaetus Beatrix*, just described.

The penial setæ of this *Benhamia* are extraordinarily long and are present to the number of four only, *i. e.* one to each spermiducal gland, as I presume from the examination of one penial seta-sac. The sac is very conspicuous and presents the appearance of a strap-shaped muscle lying in a straight course among the coils of the spermiducal gland. The seta itself is curved, and measured in a straight line from one end of the curve to the other 5 millim. I calculate, therefore, that the actual length of the seta, when straightened out, is about

7 millim. This is proportionately longer than the penial setæ of any other member of the genus except *B. sylvestris*, which species, as I have already mentioned, comes very near to *B. tanganyikæ*. The proportions of the length of the penial setæ and the total length of the body are, in fact, roughly the same, about one-ninth.

The penial seta is not only very long, but it is very thin; at the basal end, where it is embedded in the sac, the thickness is hardly, if at all, greater than that of the ordinary setæ of the body. The diameter gradually diminishes to the other, free, extremity of the seta, which is not more than one-fourth of the diameter of the thicker end. Coincidentally with this gradual diminution in thickness is an alteration in colour. The embedded end of the seta is of a horn-yellow; the free extremity is perfectly colourless. The actual tip of this seta is strongly hooked. For a very short distance before its termination the seta is spirally twisted in a way which is very common in this genus. This region of the seta has a few irregularly arranged and sharp spinelets, whose points are directed towards the extremity of the seta. It is obviously only in details that the penial seta of *B. tanganyikæ* differs from that of *B. sylvestris*. But this particular pattern is not uncommon in *Benhamia*; and after all the spiral twisting and the apparently fewer spinelets distinguish the penial seta from that of its close ally *B. sylvestris*.

The spermathecae are two pairs and lie in segments viii and ix. They show some differences from those of *B. sylvestris* as figured by Michaelsen. The pouches themselves are very large and thin-walled and their distinction from the thick-walled duct is thus very evident. The latter is long and coiled, not simply bent twice as in *B. sylvestris*; it is also more slender than in that species, and thus appears longer. The duct appears to be quite as long as the pouch. The end of the duct where it opens on to the exterior is rather wider. The diverticulum is single and spherical. It is connected by a duct of its own length, which is narrow, with either the end of the pouch or the beginning of its duct. It is a little difficult to say which, for the pouch narrows rapidly but gradually into the duct. The region, however, into which the diverticulum opens is thick-walled and nacreous in appearance, so we may, perhaps, regard it as the duct.

I shall now extract from the foregoing account of the structure of *Benhamia tanganyikæ* the reasons which lead me to regard it as a new species distinct from its obviously near ally *B. sylvestris*. They are the following:—

(1) *B. tanganyikæ* is almost exactly twice the size of *B. sylvestris*.

(2) The clitellum of *B. tanganyikæ* is more extensive and is developed all round the body instead of being saddle-shaped.

(3) The orifices of the spermiducal glands and the sperm-duct are enclosed in a depressed and sucker-like area, which is divided by a median furrow. In *B. sylvestris* the clitellum is shorter and there is no mention by Michaelsen of the depressed genital area and the groove dividing the two sides.

(4) The duct of the spermatheca appears to be longer and more slender in *B. tanganyikæ* than in *B. sylvestris* and the diverticulum opens more distinctly into the duct.

(5) The nephridia of *B. tanganyikæ* are disposed in series. Those of *B. sylvestris* are "diffuse."

(6) The sperm-sacs are somewhat different in the two species.

(7) The penial setæ of *B. tanganyikæ* are corkscrew-shaped at end and have fewer denticulations than in *B. sylvestris*.

BIBLIOGRAPHICAL NOTICES.

The Fish River Bush and its Wild Animals. By W. T. BLACK, M.R.C.S., L.S.A. Edinburgh & London: Young J. Pentland, 1901.

THIS little work consists of a series of articles on the Natural History of South Africa, from the 'Edinburgh New Philosophical Journal,' published in 1853. Although many of these are interesting, it is doubtful whether they are sufficiently so to justify their resurrection after half a century.

'*The Country.*' Edited by HARRY ROBERTS. J. M. Dent & Co.

THIS is another addition to the long list of "Monthlies" having for its object the record of the English fauna and flora, agriculture, horticulture, and the habits, homes, and industries of the people of rural England, as they exist at the present time. Folk-lore, Archæology, and Sports are also to find a place in its pages.

Three numbers have already appeared, and these promise well for the future. It is profusely and beautifully illustrated, and the articles are good of their kind.